

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway
Semester II Examinations 2004 / 2005

Exam Code(s) 4FM1
Exam(s) B.Sc. in Financial Mathematics and Economics

Module Code(s) EC411
Module(s) Seminar In Finance

Paper No.
 Repeat Paper

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Instructions: *All questions in Section A carry 5 marks each and all questions in Section B carry 25 marks each. Questions 1 to 5 are compulsory and the remaining three questions have 'either' 'or' option*

Duration Two Hours
No. of Pages 3
Department(s) Economics
Course Co-ordinator(s) Dr.S.Raghavendra

Requirements:

MCQ None
 Handout None
 Statistical Tables None
 Graph Paper None
 Log Graph Paper None
 Other Material None

Final Examination: EC411 Seminar in Finance

Maximum Duration: 2 hours

Max Marks: 100

Note: All questions in Section A carry 5 marks each and all questions in Section B carry 25 marks each. Question numbers 1 to 5 are compulsory and the remaining three questions have 'either' 'or' option

Section A

1. Define Two-Fund separation theorem.
2. Assume that security returns are normally distributed. Compare portfolios A and B using both first- and second –order dominance:

| <i>CaseI</i> | <i>CaseII</i> | <i>CaseIII</i> |
|-----------------------|-----------------------|-----------------------|
| $\sigma_A > \sigma_B$ | $\sigma_A = \sigma_B$ | $\sigma_A < \sigma_B$ |
| $E_A = E_B$ | $E_A > E_B$ | $E_A < E_B$ |

3. If the expected return for the market portfolio is 8 percent and the risk-free rate is 5 percent, what does the capital asset pricing model predict the expected return on a security with a beta of 3.0 to be?
4. Explain Fisher's separation theorem and discuss how it survives even in the world of uncertainty.
5. What is the problem in using mean-variance criterion in measuring risk? Illustrate this point.

Section B

6A

Suppose that there exist two risky securities 1 and 2 in the market. A particular investor in this market has projected the following characteristics for these stocks along with a risk-less Treasury bill:

$$E(R_1) = 0.12 \quad E(R_2) = 0.18; \quad \sigma_1 = 0.20 \quad \sigma_2 = 0.40; \quad \sigma_{1,2} = -0.01$$

The expected return or implied interest rate on the risk-less t-bill is 8%. Given the interest rate and the above stock projections, determine:

- The stock weightings for the optimal portfolio of risky securities for this investor. [7]
- The expected return of his portfolio of stocks. [6]
- The risk of his stock portfolio. [6]
- The characteristics of capital market line faced by this investor. [6]

OR

6B

The following are the estimates of cash flows for four projects, each of which has a five-year life.¹

| Year | A | B | C | D | PV at 10% |
|------|-------|-------|-------|-------|-----------|
| 0 | -1000 | -1000 | -1000 | -1000 | 1.000 |
| 1 | 100 | 0 | 100 | 200 | 0.909 |
| 2 | 900 | 0 | 200 | 300 | 0.826 |
| 3 | 100 | 300 | 300 | 500 | 0.751 |
| 4 | -100 | 700 | 400 | 500 | 0.683 |
| 5 | -400 | 1300 | 1250 | 600 | 0.621 |

Calculate ARR, NPV and IRR to choose the project, which maximizes shareholder's wealth. Discuss the conflict in the selection of projects using NPV and IRR and prove that NPV is the only criterion that is consistent with maximizing shareholder's wealth.

7A

Consider the following assumptions:

One period model with two dates: date 0 and date 1

Initial endowments of consumer good at date 0 is Y_0

Consumption at date 0 and 1: C_0 and C_1

Utility derived from consumption: $U(C_0, C_1) = C_0^\alpha \cdot C_1^\beta$ where $\beta < \alpha < 1$

Savings of S_0 at date 0 returns $(1+r)S_0$ units of the consumer good at date 1

Production function is given by $P_1 = A(I_0^\gamma)$, where $A > 0$, $\gamma < 1$ and $I_0 = Y_0 - C_0$

Derive the analytical solution for optimal consumption with production and capital markets. Suppose $\alpha = 0.6$, $\beta = 0.4$, $\gamma = 0.5$, $r = 0.5$, $Y_0 = 100$ and $A = 10$ and compute the numerical values of optimal consumption and the corresponding total utility.

¹ Note that these four projects are mutually exclusive

OR

7B

The following data have been developed for the Pizza Hut.

| State | Probability | Market Return | Return for the firm |
|-------|-------------|---------------|---------------------|
| 1 | 0.1 | -0.15 | -0.30 |
| 2 | 0.3 | 0.05 | 0.00 |
| 3 | 0.4 | 0.15 | 0.20 |
| 4 | 0.2 | 0.20 | 0.50 |

If the risk-free rate is 6%, calculate the following:

- (a) The expected market return [3]
- (b) Determine the equation of the security market line [7]
- (c) The covariance of the return for Pizza Hut with the market return [5]
- (d) What is the required return for the company? How does this compare with its expected return? [10]

8A

Discuss how Robinson Crusoe, with two risky assets, obtains his optimal portfolio in the following situations:

- a. Without exchange. [10]
- b. With exchange. What exactly does introducing 'exchange' mean and what is the implication of introducing exchange in this model? [15]

OR

8B

Discuss the theory of choice under uncertainty. Develop a tool and discuss its properties. Using the tool, derive Markowitz and Pratt-Arrow risk premium measures and explain the essential differences in the following situation:

Suppose that an individual with a level of wealth euro. 20,000 and the logarithmic utility function is exposed to the following risks:

- (a) 50/50 chance of gaining or losing euro. 10
- (b) 80% chance of losing euro. 1000 and a 20% chance of losing euro. 10,000

Derive the risk premium using the above measures and discuss the essential difference in these two measures.